

student who is commencing to study the subject. To a large extent the book is based on the "Kleine Praktikum," arranged by Prof. Nernst for students of physical chemistry at the universities of Göttingen and Berlin. As such it presents many features of merit, but at the same time a lack of discretion in regard to the relative amounts of space devoted to the various sections of the subject detracts very largely from its value as a work for general laboratory use. Only nine pages, for example, are devoted to the chapter on chemical statics and dynamics, whereas twenty-two are taken up by that on the determination of density. Again, thermochemistry is liberally treated, while spectroscopic and electrolytic work are not dealt with at all. Apart from this lack of proportion, the subject-matter is carefully handled, and the exercises are in general well chosen. Special stress is laid on the application of physico-chemical methods in connection with quantitative analysis and the determination of the constitution of organic compounds. The translator has added a chapter on the construction and use of the thermostat, and also an appendix on the use of the electroscope in radio-active work.

(2) In consideration of the fact that preparative work in inorganic chemistry forms an essential part of the training of the modern chemical student, an addition to the rather scanty literature of the subject is not unwelcome. In this book the authors outline a course of laboratory work which is essentially synthetic in nature, and is designed to aid in acquiring a more adequate knowledge of inorganic chemistry than is to be obtained by practice in chemical analysis alone. It is intended primarily for those who have passed beyond the more elementary stage in their study of chemistry. Although this is the case, the experimental part of the book is set out in relatively complete detail, and, to assist in the study of the theoretical relations involved, brief discussions of a general nature are interspersed throughout the book.

The experiments, which involve the preparation of more than 200 substances, have been carefully compiled, and the processes have been tested in the authors' own laboratories.

Having regard to the meritorious nature of the contents of the book, it is unfortunate that the authors should have departed from the usual practice in the arrangement of their material. Instead of treating the compounds according to the periodic groups, they have chosen to base the classification upon the different types of combination. It is claimed that this arrangement results in a better comprehension of analogous methods of preparation and analogous properties, and a more intimate amalgamation of experimental and theoretical chemistry. The justice of this claim appears doubtful. On the other hand, the general impression created by the arrangement is that the experiments have been written down in haphazard order, with the result that closely related compounds are often widely separated. In these circumstances a re-arrangement of the material on the lines of the periodic table would add to the value of the book.

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SCIENTIFIC METHOD IN GEOGRAPHY.

Macmillan's Practical Modern Geographies. (1) *A Geography of the British Isles.* By Dr. A. Morley Davies. Pp. xiv+358. Price 3s.

(2) *Practical Exercises in Geography.* By B. C. Wallis. Pp. xxiii+184. (London: Macmillan and Co., Ltd., 1909.) Price 2s. 6d.

(1) IN the "Geography of the British Isles," Dr. Davies introduces each section by a number of exercises with maps and statistics, so that pupils may have inferences of their own gleanings to help them to appreciate the descriptive portions of the book. This is an interesting experiment, and is carried out with considerable success, though chances are missed in the descriptive paragraphs which might have been used to teach rather more by appeal to the imagination. In that way, too, the work would have been made more valuable as a book for the pupils themselves to handle.

The subject is introduced through a brief survey of the British region as a whole, and then its tides and climate are considered, after which districts are studied in a regular sequence. It is characteristic of the district-study in this book that no attempt is made to define the districts in any exclusive fashion; they are chosen as geographical units, and the occasional overlapping only enhances the thoroughness of the survey.

London is of such unique interest, and shows in so many ways the influence of the past on the present geographical conditions that it might have been considered in more detail, especially from this point of view. A fuller account might also have prompted teachers in other centres to study their own towns in similar fashion, and thence to introduce local and practical considerations into their teaching. A large number of district maps and some good photographs, mostly illustrating physical features, enrich this book, and an alphabetical index of the abbreviated names used on the maps is a useful addition.

(2) "Practical Exercises in Geography" is a reasoned attempt to work out a continuous series of practical exercises, some of the nature of experiments, some "in the field," and some in the class-room. The course begins with the simplest rudiments of surveying, and leads up very effectively to the understanding of contour lines and the relief of the country, the United Kingdom being, of course, the chief object of study.

Following this are exercises on the factors of climate, and from the basis of the study of relief and of climate we proceed to vegetation and human activities. A less satisfactory chapter on rocks and minerals is inserted mainly for the purpose of drawing in the consideration of coal, iron, and other mineral products. The definition of metamorphic rocks as "rocks which were once 'water' rocks and have since been changed, usually by the action of heat," is objectionable.

The course should give a reasonable knowledge of British geography in a somewhat unusual fashion, but it is to be feared that the knowledge of other

areas acquired here and there would not be satisfactory for any purpose unless woven into a more complete system by the teacher. An interesting experiment is the inclusion of additional exercises, which are based upon descriptions extracted from the volumes of the Highways and Byways Series. They are well chosen to illustrate the different types of English scenery, and should be a useful link between æsthetic appreciation and exact observation.

OUR BOOK SHELF.

Carburettors, Vaporisers, and Distributing Valves used in Internal Combustion Engines. By E. Butler. Pp. xi + 176. (London: C. Griffin and Co., Ltd., 1909.) Price 6s. net.

MR. BUTLER has written an interesting book on a subject which hitherto has not had justice done to it; and he is to be congratulated upon his bold decision to devote a book exclusively to these matters of detail instead of compressing them into the small space that can be spared in books dealing with internal combustion engines in their complete form. It cannot, of course, replace the completer treatises, but it is an excellent adjunct to them and is evidently written by one who is thoroughly familiar with this side of the work.

The volume contains twelve short chapters, of which the first four are concerned with surface and spray carburettors for petrol and alcohol motors, carburettors capable of automatically adjusting the air and petrol supplies over a wide range of speed, and various types of vaporisers for use with the heavy oils forming the second distillate from petroleum. The remainder of the book includes descriptions of various forms of admission and exhaust valves used on all classes of internal-combustion engines, together with some discussion of methods of actuating, timing, and water-cooling them.

Mr. Butler is an inventor on these lines, and has made himself familiar with what others have done in the same field; thus there are illustrations of no fewer than fifty-two different kinds of carburettor and vaporiser. With so much study of these matters, we wonder to find that he is apparently unaware of the increasingly common practice with motor vehicles of using the heat of the exhaust gases to warm, not the mixture as a whole, but the air supply only. The warm air is then passed over the jet and all the other arrangements are as usual. At least equal economy is obtained in this way besides greater ease of fitting and a lowering of the prime cost. Even with so simplified a form of carburettor or vaporiser as this makes, it has been found that the cylinders do not require cleaning out at any more frequent intervals.

As regards the valve mechanisms, we are glad to find that the author has included a description of the Knight engine, and, further, that he has given a good deal of space to the discussion of sliding and rotary valves. We cannot but feel that the poppet type of valve is unlikely to be permanently used, and the author deserves our thanks for having taken us some steps along the road towards a better form of valve mechanism. Many motor manufacturers are working in the same direction, and there is no doubt that we shall soon be hearing of other suggested forms of valve. If the experience of extended use of the Knight engine is favourable, it will give great impetus to this development. With the largest forms of gas engine there are, of course, already many engines now running with complete success, using slide valve forms of control for either the admission or exhaust ports, or for both.

Cotton Spinning Calculations. By W. S. Taggart. Pp. xiv + 335. (London: Macmillan and Co., Ltd., 1909.) Price 4s. net.

THE author of this excellent and beautifully printed text-book assumes that the reader has no special equipment beyond an elementary knowledge of arithmetic, and some acquaintance with the various processes of cotton manufacture and the technical nomenclature used in connection therewith. In the introductory chapter, he gives general calculations respecting the velocity ratio in wheel trains and belt gearing; the surface velocities of rollers and the stretching of fibres resulting from "draft"; the estimation of "hanks" and "counts"; and the force actions of levers. A set of exercises closes this part. In succeeding chapters the treatment is more direct and special. The various machines through which the material passes, from the Scutcher to the Ring Spinning Frame, are considered in detail. The author has had the assistance of the leading manufacturers of textile machinery in the cotton district, and is thus able to give diagrams, drawings, and tables of wheel teeth, showing very clearly with full details the mechanisms used in all the standard types of machines. The calculations are therefore based on numbers representing the best modern practice. A special chapter is devoted to the consideration of epicyclic or differential gears and the design of cone drums. Thus, by repetition, and by the wealth of illustration provided, no reader should fail to obtain a thorough insight into the action of the most complicated of the mechanisms. This kind of quantitative work is essential if a student is to have anything more than a superficial knowledge of the subject, and it will enable him readily to calculate the wheel changes, &c., necessary in order that a machine shall be able to cope with the varying demands made upon it.

The author concludes his very interesting volume with a number of useful tables and an index. Both author and printers are to be congratulated on the production of this admirable work, which should be in the hands of everyone, at home and abroad, who is interested in the practical working of textile machinery.

Proceedings of the Aristotelian Society. New series, Vol. ix. Pp. 259. (London: Williams and Norgate, 1909.) Price 10s. 6d. net.

OF the nine articles contained in this volume the most important are, perhaps, Prof. Alexander's essay on "Mental Activity in Willing and Acting," and Prof. Stout's rejoinder, "Are Presentations Mental or Physical?" The point at issue in these papers is one of fundamental importance for both psychology and the theory of knowledge, since Prof. Alexander's contention, to put it quite plainly, is that all mental activity consists solely of conation and feeling, or possibly, since it is conceivable that the feeling or affective side of mental life may be reducible to experience of successful and thwarted conation, of conations alone. Hence he refuses to admit the existence of such cognitive processes as have usually been supposed to be denoted by the names sensation, imagination, perception. On his view the *object* apprehended in all these processes is physical; the *process* involved is simply conation directed towards a specific physical object. It follows, of course, that if Prof. Alexander makes out his case, "presentations" must be deleted entirely from our account of the stuff out of which mind is made, and, in the theory of knowledge, any doctrine which assumes either that "we can only know our own sensations," or that, at any rate, we begin by knowing our sensations and